



**WAGENINGEN EVALUATING PROGRAMS  
FOR ANALYTICAL LABORATORIES**

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**Certificate of Analysis**



**International Sediment Exchange for Tests on Organic Contaminants**

**REFERENCE MATERIAL**

**SETOC sample 707**



## Certificate of Analysis SETOC 707

### General Information

In this report an overview is given of analytical data for this sample collected in our proficiency testing program. The consensus values are calculated using a robust statistical model. With this NDA model mean and standard deviation are calculated using all reported data when at least 8 results are left after removal of reported 'lower than' (<) and 0 (= zero) values. No outliers are removed.

This report is divided into three sections: Consensus Values, Indicative Values and Values for Information. The division is made on the reliability of the data. Consensus Values are based on at least 16 results while the coefficient of variation is smaller than 25 %. Indicative Values are based on at least 8 and less than 16 results or a coefficient of variation between 25 % and 50 %. Other values, based on more than 2 and less than 8 results or a coefficient of variation higher than 50 %, are given for information only.

In the sections with Consensus Values and Indicative Values the following parameters are given: mean, standard deviation, coefficient of variation, number of results, median and MAD (Median of Absolute Deviation) and the uncertainty in the consensus values. The confidence limits (at 95 % probability) are calculated for these determinands.

In the section with Information Values the following parameters are given: median, MAD and number of results. For determinands which have at least 5 results reported as smaller than (<) the median of these 'smaller than results' is calculated. In some cases this median of '<' values is much smaller than median and mean of the indicative values. This may be caused by a too optimistic (too low) value for the detection limit reported by a (small) majority of participating laboratories who report '<' -values.

All values, expressed on a weight basis (kg or %), are reported in oven dry (105 °C) material. Moisture is reported in the material as received.

### Sample information

WEPAL reference materials are from natural sources only. There is no spiking, mixing or other alterations of the samples. For sample preparation the SETOC samples are dried at 40 °C and milled to pass a 0.5 mm sieve.

This SETOC sample 707 of Marine Sediment from Netherlands is prepared for the WEPAL proficiency programs. The sample is used in 1 period (or round). The results on which the values in this report are based were taken from the period given in the following table.

Year	Round	Number
1993	1	3



## Consensus Values SETOC 707

### Method: Polycyclic aromatic hydrocarbons

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
benzo(k)fluoranthene	µg/kg	121	29.1	24.1	28	126	20.0	6.9	110	-	132
fluoranthene	µg/kg	307	58.8	19.2	28	314	38.5	13.9	284	-	330

### Method: Metals

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
Cd	mg/kg	1.34	0.316	23.5	16	1.40	0.230	0.099	1.18	-	1.51
Cr	mg/kg	63.0	8.27	13.1	17	63.0	5.30	2.51	58.7	-	67.2
Cu	mg/kg	26.5	2.02	7.6	17	26.5	1.40	0.61	25.5	-	27.6
Ni	mg/kg	21.3	2.92	13.7	16	21.8	1.96	0.91	19.8	-	22.9
Pb	mg/kg	51.9	11.42	22.0	17	52.1	8.07	3.46	46.1	-	57.8
Zn	mg/kg	177	14.9	8.4	18	176	10.5	4.4	170	-	185



## Indicative Values SETOC 707

### Method: Polycyclic aromatic hydrocarbons

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
benz(a)anthracene	µg/kg	148	59.5	40.1	28	150	42.5	14.0	125	-	171
benzo(a)pyrene	µg/kg	194	67.6	34.9	29	200	50.0	15.7	168	-	220
benzo(b)fluoranthene	µg/kg	290	142.0	49.0	28	310	101.2	33.5	235	-	345
benzo(ghi)perylene	µg/kg	144	61.0	42.2	28	150	41.5	14.4	121	-	168
chrysene	µg/kg	166	56.6	34.2	28	162	38.5	13.4	144	-	188
fluorene	µg/kg	34.3	15.29	44.5	16	39.8	11.00	4.78	26.2	-	42.5
indeno(1,2,3-cd)pyrene	µg/kg	190	83.1	43.6	29	200	55.0	19.3	159	-	222
phenanthrene	µg/kg	149	55.7	37.3	28	150	39.5	13.2	128	-	171
pyrene	µg/kg	235	87.3	37.2	25	240	61.0	21.8	199	-	271

### Method: Polychlorobiphenyls

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
PCB 138	µg/kg	7.87	3.497	44.4	11	9.00	2.700	1.318	5.55	-	10.2
PCB 153	µg/kg	8.06	3.196	39.7	12	8.95	2.300	1.153	6.05	-	10.1

### Method: Metals

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
As	mg/kg	18.1	3.81	21.1	15	18.3	2.70	1.23	16.0	-	20.2
Hg	mg/kg	0.418	0.1185	28.3	11	0.440	0.0900	0.0447	0.340	-	0.497



## Informative Values SETOC 707

### Method: Polycyclic aromatic hydrocarbons

Element	Unit	Median	MAD	N	Results smaller than (<)	
					Median of <	N
acenaphthene	µg/kg	25.0	13.00	13	70.0	14
acenaphthylene	µg/kg	31.0	17.10	9	100.0	17
anthracene	µg/kg	48.0	16.50	23	50.0	8
dibenz(ah)anthracene	µg/kg	60.0	40.00	17	60.0	11
naphthalene	µg/kg	100.0	48.50	16	50.0	12

### Method: Polychlorobiphenyls

Element	Unit	Median	MAD	N	Results smaller than (<)	
					Median of <	N
PCB 028	µg/kg	3.36	2.120	6	7.50	14
PCB 052	µg/kg	3.28	1.350	9	10.00	11
PCB 101	µg/kg	5.75	1.910	7	10.00	13
PCB 105	µg/kg	2.20	1.050	3		
PCB 118	µg/kg	4.58	1.835	6	10.00	9
PCB 149	µg/kg	9.40	2.880	3		
PCB 180	µg/kg	6.60	2.285	10	10.00	11

### Method: Organochlorine pesticides

Element	Unit	Median	MAD	N	Results smaller than (<)	
					Median of <	N
aldrin	µg/kg	-	-	0	7.50	16
alpha-endosulfan	µg/kg	-	-	0	5.00	15
alpha-HCH	µg/kg	-	-	0	7.00	17
beta-HCH	µg/kg	-	-	0	8.00	17
delta-HCH	µg/kg	-	-	0	5.00	11
dieldrin	µg/kg	-	-	0	10.0	15
endrin	µg/kg	-	-	0	7.50	16
gamma-HCH	µg/kg	1.36	0.360	3	5.00	15
heptachlor	µg/kg	-	-	0	7.50	16
heptachlor epoxide	µg/kg	-	-	0	10.0	15
hexachlorobenzene	µg/kg	1.31	0.285	6	10.00	13
isodrin	µg/kg	-	-	0	10.0	9
o,p`-DDD	µg/kg	-	-	0	10.0	11
o,p`-DDE	µg/kg	-	-	0	10.0	12
o,p`-DDT	µg/kg	-	-	0	10.0	15
p,p`-DDD	µg/kg	3.19	0.690	4	9.50	10



		Informative Values			SETOC 707	
p,p`-DDE	µg/kg	2.10	0.810	5	10.00	13
p,p`-DDT	µg/kg	2.13	0.130	3	10.00	14
pentachlorobenzene	µg/kg	-	-	0	10.0	8
<b>Method: Organochlorine pesticides</b>					<b>Results smaller than (&lt;)</b>	
<b>Element</b>	<b>Unit</b>	<b>Median</b>	<b>MAD</b>	<b>N</b>	<b>Median of &lt;</b>	<b>N</b>
telodrin	µg/kg	-	-	0	10.0	11

**Method: Other parameters**

<b>Element</b>	<b>Unit</b>	<b>Median</b>	<b>MAD</b>	<b>N</b>
EOX	mg/kg	0.770	0.2300	3
Particles < 2 µm	%	24.0	1.00	3

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